I CLAIM:

1. A method for enhancing *in situ* bioremediation of a nonaqueous halogenated solvent in ground water comprising adding to the ground water an amount of an electron donor sufficient for a halo-respiring microbe in the ground water to use the nonaqueous halogenated solvent as an electron acceptor, thereby reductively dehalogenating the nonaqueous halogenated solvent into innocuous compounds, wherein said electron donor enhances mass transfer of the nonaqueous halogenated solvents into solution.

2. The method of claim 1 wherein said electron donor functions as a surfactant.

3. The method of claim 2 wherein said electron donor is added at a concentration above the critical micelle concentration in water.

4. The method of claim 1 wherein said electron donor functions as a co-solvent.

5. The method of claim 1 wherein said electron donor is a member selected from the group consisting of C_2-C_4 carboxylic acids and hydroxy acids, salts thereof, esters of C_2-C_4 carboxylic acids and hydroxy acids, and mixtures thereof.

6. The method of claim 5 wherein said electron donor is a member selected from the group consisting of lactic acid, salts thereof, lactate esters, and mixtures thereof.

7. The method of claim 6 wherein said salts of lactic acid are selected from the group consisting of sodium lactate, potassium lactate, lithium lactate, ammonium lactate, calcium lactate, magnesium lactate, manganese lactate, zinc lactate, ferrous lactate, aluminum lactate, and mixtures thereof.

8. The method of claim 7 wherein said electron donor is a mixture of sodium lactate and ethyl lactate.

9. The method of claim 1 wherein said electron donor comprises sodium lactate.

10. The method of claim 1 wherein said electron donor comprises ethyl lactate.

11. The method of claim 10 wherein said electron donor comprises a mixture of sodium lactate and ethyl lactate.

12. The method of claim 1 wherein said nonaqueous halogenated solvent comprises a nonaqueous chlorinated solvent.

13. The method of claim 12 wherein said nonaqueous chlorinated solvent is a member selected from the group consisting of perchloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE), vinyl chloride (VC), and mixtures thereof.

14. The method of claim 1 wherein said microbe is indigenous to the ground water.

15. The method of claim 1 further comprising adding the halo-respiring microbe to the ground water.

16. The method of claim 15 wherein said halo-respiring microbe is a chloro-respiring microbe.

17. The method of claim 16 wherein said chloro-respiring microbe is a bacterium.

18. The method of claim 17 wherein said bacterium is a member selected from the group consisting of *Dehalococcoides ethenogenes* strain 195, the Pinellas culture, and mixtures thereof.

19. The method of claim 1 wherein said innocuous compounds are members selected from the group consisting of ethylene, ethane, carbon dioxide, water, halogen salts, and mixtures thereof.

20. A method for enhancing bioremediation of a nonaqueous chlorinated solvent in ground water comprising adding to the ground water an amount of an electron donor sufficient for a chloro-respiring microbe to use the nonaqueous chlorinated solvent as an electron acceptor, thus reductively dechlorinating the nonaqueous chlorinated solvent into innocuous compounds, wherein said electron donor enhances mass transfer of the nonaqueous chlorinated solvents into solution.

21. The method of claim 20 wherein said electron donor functions as a surfactant.

22. The method of claim 21 wherein said electron donor is added at a concentration above the critical micelle concentration in water.

23. The method of claim 20 wherein said electron donor functions as a co-solvent.

24. The method of claim 20 wherein said electron donor is a member selected from the group consisting of C_2-C_4 carboxylic acids and hydroxy acids, salts thereof, esters of C_2-C_4 carboxylic acids and hydroxy acids, and mixtures thereof.

25. The method of claim 24 wherein said electron donor is a member selected from the group consisting of lactic acid, salts thereof, lactate esters, and mixtures thereof.

26. The method of claim 25 wherein said salts of lactic acid are selected from the group consisting of sodium lactate, potassium lactate, lithium lactate, ammonium lactate, calcium lactate, magnesium lactate, manganese lactate, zinc lactate, ferrous lactate, aluminum lactate, and mixtures thereof.

27. The method of claim 20 wherein said electron donor comprises sodium lactate.

28. The method of claim 20 wherein said electron donor comprises ethyl lactate.

29. The method of claim 28 wherein said electron donor comprises a mixture of sodium lactate and ethyl lactate.

30. The method of claim 20 wherein said nonaqueous chlorinated solvent is a member selected from the group consisting of perchloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE), vinyl chloride (VC), and mixtures thereof.

31. The method of claim 20 wherein said microbe is indigenous to the ground water.

32. The method of claim 20 further comprising adding the chloro-respiring microbe to the ground water.

33. The method of claim 32 wherein said chloro-respiring microbe is a bacterium.

34. The method of claim 33 wherein said bacterium is a member selected from the group consisting of *Dehalococcoides ethenogenes* strain 195, the Pinellas culture, and mixtures thereof.

35. The method of claim 20 wherein said innocuous compounds are members selected from the group consisting of ethylene, ethane, carbon dioxide, water, chlorine salts, and mixtures thereof.

36. A method for enhancing mass transfer of a nonaqueous halogenated solvent present in a nonaqueous residual source of contamination in ground water, said ground water comprising an aqueous phase, into said aqueous phase comprising adding to said ground water an effective amount of a composition that donates electrons for microbe-mediated reductive dehalogenation of said nonaqueous halogenated solvent into innocuous compounds and functions as a surfactant or co-solvent for solubilizing said nonaqueous halogenated solvent.

37. The method of claim 36 wherein said composition functions as a surfactant and is added at a concentration above the critical micelle concentration in water.

38. The method of claim 36 wherein said composition functions as a co-solvent.

39. The method of claim 36 wherein said composition is a member selected from the group consisting of C_2-C_4 carboxylic acids and hydroxy acids, salts thereof, esters of C_2-C_4 carboxylic acids and hydroxy acids, and mixtures thereof.

40. The method of claim 39 wherein said composition is a member selected from the group consisting of lactic acid, salts thereof, lactate esters, and mixtures thereof.

41. The method of claim 40 wherein said salts of lactic acid are selected from the group consisting of sodium lactate, potassium lactate, lithium lactate, ammonium lactate, calcium lactate, magnesium lactate, manganese lactate, zinc lactate, ferrous lactate, aluminum lactate, and mixtures thereof.

42. The method of claim 36 wherein said composition comprises sodium lactate.

43. The method of claim 36 wherein said composition comprises ethyl lactate.

44. The method of claim 43 wherein said composition comprises a mixture of sodium lactate and ethyl lactate.

45. The method of claim 36 wherein said nonaqueous halogenated solvent is a member selected from the group consisting of perchloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE), vinyl chloride (VC), and mixtures thereof.

46. The method of claim 36 wherein said microbe is indigenous to the ground water.

47. The method of claim 36 further comprising adding a chloro-respiring microbe to the ground water for mediating said reductive dehalogenation.

48. The method of claim 47 wherein said chloro-respiring microbe is a bacterium.

49. The method of claim 48 wherein said bacterium is a member selected from the group consisting of *Dehalococcoides ethenogenes* strain 195, the Pinellas culture, and mixtures thereof.

50. The method of claim 36 wherein said innocuous compounds are members selected from the group consisting of ethylene, ethane, carbon dioxide, water, chlorine salts, and mixtures thereof.